Chala et al. BMC Public Health (2017) 17:762
DOI 10.1186/s12889-017-4763-0

BMC Public Health

RESEARCH ARTICLE Open Access

Prevalence of disability and associated factors in Dabat Health and Demographic Surveillance System site, northwest Ethiopia

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Abstract

Background: Despite the high burden of disability in Ethiopia, little is known about it, particularly in the study area. Hence, this study aimed to investigate the prevalence and factors associated with disability at Dabat Health and Demographic Surveillance System (HDSS) site, northwest Ethiopia.

Method: A population-based study was conducted from October to December 2014 at Dabat HDSS site. A total of 67,395 people were included in the study. The multivariable binary logistic regression analysis was employed to identify factors associated with disability. The Adjusted Odds Ratio (AOR) with a 95% Confidence Interval (CI) was estimated to show the strength of association. A *p*-value of <0.05 was used to declare statistical significance.

Results: One thousand two hundred twenty-eight individuals were reported to have a disability giving a prevalence rate of 1.82%, of which, about 39% was related to a vision disability. The high odds of disability were observed among the elderly (≥50 years) [AOR: 4.49; 95% CI: 1.95, 10.33], severely food in-secured [AOR: 2.11; 95% CI: 1.59, 2.80], and separated marital status [AOR: 7.52; 95% CI: 1.18, 47.84]. While having a paid job [AOR: 0.46; 95% CI: 0.28, 0.77], being in the richest quintile [AOR: 0.55; 95% CI: 0.41, 0.75], and high engagement in work-related physical activities [AOR: 0.36; 95% CI: 0.27, 0.49] were inversely associated with the disability.

Conclusion: Disability is a major public health problem, and the burden is noticeable in the study area. Vision disability is the highest of all disabilities. Thus, efforts must be made on educating the public about disability and injury prevention. Measures that reduce disability should target the elderly, the poorer and the unemployed segment of the population.

Keywords: Disability, Vision disability, HDSS, Dabat, Ethiopia

Background

The World Health Organization estimates that globally around 1 billion people (15%) live with some sort of disability [1]; the majority live in resource-limited settings [2, 3]. This number is increasing due to the rise of an aging population, advancement of medical care, and population growth across the world [3]. However, the subject is considered as a human right and global health issues as well as an agenda for development [2].

Disability is defined as having difficulties with performing activities of daily living (ADL), and the phenomena are expressed as an interaction between an individual's health condition and the environment he or she is living in [4, 5]. The Washington group defined disability as having at least a severe difficulty or limitation in performing key ADL, such as sight, hearing, walking or climbing steps, remembering, or concentrating [6].

People with disability face different challenges during their lifetime. This can be explained by social exclusion, stigma, severe health challenges, limited access to school and business [4]. In addition, it affects not only the person's individual life but also his or her participation and role in society [2]. The difficulties and barriers

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experienced by people with disabilities are not only due to their own health conditions, but also because of inadequate policies and standards empowering and supporting these people. This is usually reflected in negative attitudes towards them, prejudices, and the inaccessibility of services [2]. In fact, disability is also linked with poverty [5, 7, 8], and people living with disabilities in developing countries face many challenges in their daily life.

Disability is caused by several factors, such as poor living conditions, poor nutrition, lack of health and sanitation facilities, different forms of accidents and injuries [7], congenital malformation, psychological dysfunctions, and birth related incidents [9].

In order to create equal opportunities in every sphere of their life, many countries, including Ethiopia, signed the convention of the rights of people with disabilities ratified by the United Nations in 2006 [2]. However, there is a major gap between implementing the stated convention and the day to day life of people with a disability. Besides, the convention urges the member countries to establish a proper mechanism that ensures a regular collection of data at the population level [10].

Ethiopia has also signed the African Decades of Disabled Persons (SADPD), which was established in South Africa in 2004 with the responsibility of coordinating efforts and resources on disability programs in Africa [7]. However, in lower and middle-income countries, such as Ethiopia, information on specific interventions, service utilization, and legislation is lacking [11]. In addition, there are only a small number of inaccessible rehabilitation facilities in the country. Besides, the lack of accessibility and employment opportunities are noted in almost all of the service areas [7], making it very challenging for people with disabilities to get out of the poverty-disability cycle. Despite the high burden, and interwoven challenges, little is known about disability in Ethiopia, particularly in the study area. This is believed to impose a great challenge for policy makers and planners to include people with disability in the inclusive development. Hence, the aim of this study was to assess the self-reported prevalence and factors associated with disability at the Dabat HDSS site.

Methods

Study design and setting

The study was conducted at the Dabat HDSS site where the census is conducted every 7 years in order to assess the changes in vital events, demography (living conditions, economic status, and health) of the population. The detailed activities of the HDSS site are mentioned elsewhere [12].This study is part of the re-census conducted from October to December 2014.

The Dabat HDSS site is located in Dabat District, northwest Ethiopia. The site was established in 1996. It covers a total of 13 kebeles, *smallest administrative unit in Ethiopia,* (9 rural and 4 urban) with 16,053 households and 67,395 inhabitants. The kebeles in the surveillance site were selected randomly, by taking all ecological zones (high land, middle land, and lowland) into account. Every household in the selected kebeles were targeted during the data collection period. Dabat HDSS is a full member of the International Network of Demographic Evaluation of Populations and Their Health (INDEPTH), a network of 44 HDSSs from the Global South.

Study population and data collection

All permanent residents in the Dabat HDSS site were included in the study. The heads of each household were interviewed to collect the necessary information with regard to events that happened in the family. When a member of a family was found to have any form of disability, he or she was interviewed by trained, diploma graduate data collectors working in the research site using a structured and pretested questionnaire. The study utilized the re-census data.

Disability, the outcome variable, was defined according to the 2011 Labor Force Survey ad hoc module (LFS AHM) [13]. Hence, the status of disability is ascertained if a person has difficulty in carrying out any of the basic activities of hearing, seeing, walking, self-care, and cognition as parts of activities of daily living. A binary outcome of "yes" or "no" option was given to identify the presence or absence of disability. For example, a respondent would answer "yes" if he or she had difficulty in self-care, and "no" if there is no problem at all. Different independent variables (Table 1) were used to assess if there was an association with our outcome variable.

Food Security is defined as existing when "all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life". In order to assess the Food security status of households, an 18 item community food insecurity accessible scale assessment tool was adapted from Household Food Insecurity Access Scale (HFIAS): Indicator Guide VERSION 3 and categorized into four levels using HFIS variables [14]. If the respondent answers "yes" to an occurrence question, a frequency of occurrence question was asked to determine whether the condition happened rarely (once or twice), sometimes (three to ten times) or often (more than ten times) in the past 4 weeks (food secure, mildly food insecure, moderately food insecure, severely food insecure). This scale has already been validated in Ethiopia [15].

The household wealth index was computed for urban and rural residents separately using the Principal Component Analysis (PCA). The urban wealth status was

Table 1 Socio-demographic characteristics of the population of Dabat HDSS, northwest Ethiopia, October-December 2014 (*N* = 67,395)

Variables	Frequency	Percent
Sex		
Male	33,181	49.23
Female	34,214	50.77
Age in years		
≤ 14	28,956	42.97
15 to 49	29,807	44.23
≥ 50	8630	12.81
Residence		
Rural	50,769	75.10
Urban	16,835	24.9
Marital status		
Under 10 years old	20,089	29.81
Married	21,814	32.37
Single	19,746	29.30
Divorced	2390	3.55
Widowed	2369	3.52
Separated	917	1.36
Cohabiting	68	0.10
Religion		
Orthodox	64,940	96.36
Muslim	2444	3.63
Others[a]	11	0.01
Ethnicity		
Amhara	67,294	99.85
Tigre	84	0.12
Others[b]	17	0.02
Education		
Not on education (<7 years)	13,672	20.29
Unable to read and write	21,149	31.38
Read and write	5541	8.22
Grade 1–4	10,960	16.26
Grade 5–6	4560	6.77
Grade 7–8	3590	5.33
Grade 9–10	4375	6.49
Grade 11–12	1957	2.90
Grade 12 and above	1591	2.36
Doing work related physical activity		
Never	4498	12.00
Sometimes	16,414	43.00
Most of the time	16,872	45.00
Occupation		
No occupation(under 10 years)	20,436	38.45
Students	13,955	26.26
Farmers	12,647	23.80
Employed permanent	1951	3.67
Private job	1167	2.20
Job seeker	1056	1.99
Merchant	656	1.23
House maid	623	1.17
Employed contract	328	0.62
Retired	296	0.56
Others(housewife, shepherd, disabled)	33	0.05
Location		
Low land	22,380	33.2
High land	45,015	66.8
Relation to the HH head		
HH head	16,082	23.86
Housewife	10,542	15.64
Son/daughter	34,702	51.49
Sister/brother	538	0.80
Mother/father	310	0.46
Grandson/granddaughter	3095	4.59
Other relative	1196	1.77
Other non-relative	930	1.38
Family size		
1–4	24,512	36.35
5–9	41,667	61.79
10–15	1250	1.85
Wealth status		
Poorest quintile	9475	14.58
Second quintile	11,344	17.45
Third quintile	13,031	20.05
Fourth quintile	14,593	22.45
Richest Quintile	16,577	25.47

[a] Catholic and Protestant
[b] Oromo and Agaw
HH stands for Household

calculated by considering properties, like selecting household assets, while the only tropical livestock unit was used for the rural residents. The variables were initially screened using the commonality value. In the PCA, the Eigenvalue of greater than one, the KMO distribution, and in the final model, the common factor scores were summed and ranked in Poorest quintile, Second quintile, Third quintile, Fourth quintile, and Richest Quintile [16].

Data processing and analysis

Data was entered into the Household Registration System (HRS) version 2.1 and analyzed using STATA version 14. Binary logistic regression was fitted to elicit factors associated with disability. The bivariable analysis was carried out, and variables with *p*-values of <0.2 were fitted to the multivariable logistic regression analysis. Both the crude odds ratio (COR) and the adjusted odds ratio (AOR) with the corresponding 95% Confidence Interval (CI) were used to show the strength of association. Finally, a p-value of <0.05 was used to declare statistical significance.

Results

A population of 67,395 living in 16, 039 households were included in the study. About 34,214 (50.77%) respondents were female and 50,769 (75.1%) were rural dwellers. The mean age of the study subjects was 23.1 years (SD 19.1 years). Nearly half, 28,952 (42.96%), of the participants were under 15 years of age (Table 1).

In this community, 1228 people were found with disabilities which corresponds to the overall prevalence rate of 1.82% [95%CI, 1.72, 1.92]. The mean (±SD) age of people with disabilities was 44.36 (±23.2) years. Regarding the types of disability, more than one-third, 534 (39%), were related to vision disability, followed by hearing 244 (18%) and walking 230 (17%) disabilities (Fig. 1). Moreover, cognitive and self-care disabilities account for 210 (15%) and 112 (11%), respectively, for the total disability. Among 1228 people who reported a disability, 11.5% of them have reported two or more types of disabilities.

Fall down injury and penetration by animal horn accounted for 155 (35.9%) and 88 (20.4%), respectively, of the common causes of disability (Table 2). Of the total study participants who experienced injury, 155 (35.9%) did not seek any treatment, while 85 (19.7%) went to traditional healers and 85 (19.7%) obtained some sort of treatment at home (Table 2). Regardless of gender, the proportion of vision disability increased with increasing age, while the rest of the disabilities were prevalent among the working age group (15–49 years old). One thousand three hundred sixty nine number of disabilities (20.3 cases per 1000 population) types of disabilities were reported among Dabat HDSS (Table 3).

The result of the multivariable logistic regression analysis showed that age, food security status, marital status, occupation, wealth status, and work-related physical activities were significantly and independently associated with disability. Consequently, the odds of getting disability were 4.49 times higher among elderly (≥ 50 years) population, compared to the younger ones (≤14 years) [AOR = 4.49; 95% CI: 1.95, 10.33]. The likelihood of disability was high among respondents with separated marital status [AOR = 7.52; 95% CI: 1.18, 47.84] and food in- secured households [AOR: 2.11; 95% CI: 1.59, 2.80]. However, being engaged in paid jobs was noted with lower odds of disability [AOR = 0.46; 95% CI: 0.28, 0.77] as compared to their counterparts. Similarly, respondents from a household with the highest wealth status [AOR: 0.76; 95% CI: 0.57, 1.00] and mostly engaged

Table 2 Causes of injury and post-injury health seeking behaviour among Dabat HDSS, North West Ethiopia, October-December 2014 (*N* = 432)

Variable	Frequency	Percentage
Causes of injury		
Fall	155	35.9
Burn	13	3.00
Poisoning	8	1.85
Drowning	1	0.23
Car accident	12	2.77
Sharp objects	57	13.12
Farming equipment	9	2.08
Hit by other person by stick	55	12.73
Animal Bite	34	7.87
Penetration by animals	88	20.4
Post injury health seeking behavior (N = 432)		
Did not need help	155	35.9
Treatment at home	85	19.6
Health post	17	3.9
Clinic	7	1.62
Health center	57	13.2
Hospital	26	6.02
Traditional Healer	85	19.7

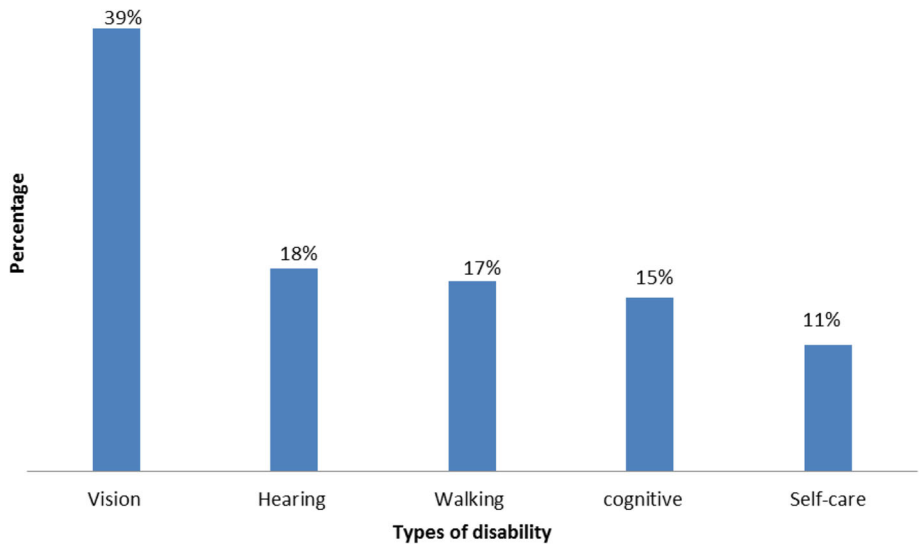

Fig. 1 Number of individuals who reported disability among population of Dabat HDSS, northwest Ethiopia. October-December 2014 (*N* = 1228)

Table 3 Types of disability by age and gender at Dabat HDSS, October-December 2014 (N = 67,395)

Types of disability (*N* = 1369)	Age < 5 years		Age 5–15 years		Age 15–49 years		Age ≥ 50 years		Total	
	M *N* = 4584	F *N* = 4503	M *N* = 9876	F *N* = 9985	M *N* = 14,601	F *N* = 15,206	M *N* = 4109	F *N* = 4521	M *N* = 33,181	F *N* = 34,214
	n (%)									
Cognitive *N* = 208	1 (0.02)	2 (0.04)	10 (0.10)	10 (0.10)	57 (0.39)	79 (0.52)	18 (0.44)	31(0.69)	86 (0.26)	122 (0.36)
Vision *N* = 534	3 (0.07)	0 (0.00)	16 (0.16)	21 (0.21)	56 (0.38)	94 (0.62)	143 (3.48)	201(4.45)	218 (0.66)	316 (0.92)
Hearing *N* = 244	2 (0.04)	0 (0.00)	15 (0.15)	13 (0.13)	52 (0.36)	67 (0.44)	41 (1.00)	54 (1.2)	110 (0.33)	134 (0.39)
Walking *N* = 230	3 (0.07)	4 (0.1)	20 (0.2)	6 (0.06)	51 (0.35)	50 (0.33)	51(1.24)	45 (1)	125 (0.38)	105 (0.31)
Self-care *N* = 153	3 (0.07)	4 (0.09)	11 (0.11)	9 (0.09)	30 (0.21)	33 (0.22)	36 (0.88)	27 (0.6)	80 (0.24)	73 (0.21)

in work-related physical activities [AOR: 0.36; 95% CI: 0.27, 0.49] were found with lower odds of getting a disability (Table 4).

Discussion

This study is one of the largest studies conducted to document key health events in Ethiopia. The overall prevalence of disability was 1.82%. This burden corresponds to 7.6% of households reporting at least one person with disability.

Our finding is in line with the study done in Ghana, 1.8% [17]. This prevalence was lower than that of a previous study done in northern Ethiopia, which was 4.9% [18]. However, it was higher than the prevalence reported from other developing countries, such as Bahrain 0.4% [19] and Nepal 1% [20]. The observed discrepancy could be attributed to variations in the measurement of disability, methods utilized [21], and the primary goals of the surveys [22]. The burden of disability in our study corresponds to 7.6% of households reporting at least one person with disability. This figure is lower than what was reported by a national disability survey conducted in Zimbabwe, where 26% of households reported at least one member with disability [23].

In this study, vision disability accounts for 534 (39%) of the total disability burden. This finding is consistent with what was reported by other African countries: Nigeria 37% [9], South Africa, 32%) [24], and Zimbabwe (26%) [23]. This could be explained by poor eye hygiene, a level of access to health care, and health seeking behaviors in most developing countries, in Africa.

Out of the total reported disability, the proportion of hearing disability was 21%. This finding was comparable to that of the study done in South Africa, which was 20% [25], whereas it was 15% in Nigeria [9] and 12% in Zimbabwe [23]. The commonest causes of hearing disabilities in low and middle-income countries are infections from meningitis, measles, maternal rubella, febrile illnesses, and genetic traits [11]. In addition, another study claimed that increasing age was associated with hearing disability [26].

In our study, increasing age was significantly associated with disability. Similar to our finding, a previous study demonstrated that there was a strong association between older age and disability [22]. This is due to the presence of co-morbidities, chronic illnesses, and injuries. Similarly, a study in India indicates that co-morbidities, such as non-communicable diseases, increase with aging, which heightened the risk of developing disability [27]. A census of South Africa also showed that the prevalence of disability increased with age, the lowest (0.2%) was observed in the age group of 0–9 years, while the highest (27%) was among those aged 80 years and above [20, 24].

Household wealth status was inversely associated with disability. The result was supported by previous reports elsewhere [18, 25]. In fact, poor living conditions, unsafe working environments, poor nutrition, lack of access to clean water, basic sanitation, health care and education [28] are all linked to low socioeconomic status which further predisposes to the risk of developing a disability. A survey from 49 countries also indicated that disability was more prevalent in poorer than in the richest wealth quintiles [1]. Similarly, one of the local studies in Ethiopia showed that the prevalence of adult disability falls as wealth increases [1]. It was also reported that severe household food insecurity was associated with higher odds of getting a disability, which was supported by other findings [18, 26]. Access to nutrition for poor people is a serious problem in Ethiopia [29]. Evidence showed that access to good nutrition is directly related to food security, which has its own implications on the incidence of disability [22].

In this study, separated marital status increased the odds of having a disability. According to a study in the Netherlands on the population of 18,973 aged 15–74,

Table 4 Factors associated with disability among people at Dabat HDSS site, northwest Ethiopia, 2014

Variables	Disability yes n(%)	COR (95%CI)	AOR (95%CI)	Over all p-value
Sex				
Female	679 (1.98)		1	0.001
Male	547 (1.65)	0.82 (0.74,0.93)	0.98 (0.75, 1.28)	
Age in year				
≤ 14	137 (0.47)	1.00		<0.001
15 to 49	517 (1.73)	3.71 (3.03, 4.48)	1.57 (0.70, 3.53)	
≥ 50	572 (6.63)	14.9 (12.37, 18.1)	4.49 (1.95, 10.33)	
Wealth status				<0.001
Poorest quintile	314 (3.31)	1		
Second quintile	256 (2.26)	67.4 (0.56,0.79)	0.76 (0.57, 1.00)	
Third quintile	201 (1.54)	0.45 (0.38, 0.54)	0.75 (0.56, 0.99)	
Fourth quintile	238 (1.63)	0.48 (0.40, 0.57)	0.67 (0.51, 0.89)	
Richest quintile	195 (1.18)	0.34 (0.29, 0.42)	0.55 (0.41, 0.75)	
Residence				>0.05
Rural	909 (1.79)	1		
Urban	319 (1.89)	1.06 (0.93, 1.21)	0.99 (0.76, 1.30)	
Educational status				<0.001
Illiterate	44 (0.32)	1		
Can read & write	823 (3.89)	12.5 (9.25, 16.9)	0.85 (0.16, 4.51)	
Primary school	110 (1.99)	6 27 (4.41, 8.91)	0.6 (0.11, 3.19)	
High school	87 (0.79)	2.48 (1.72, 3.56)	0.6 (0.11, 3.18)	
Diploma and above	162 (1.01)	3.15 (2.26, 4.40)	0.3 (0.06, 1.63)	
Occupation				
Under age	114 (0.56)	1		
Student	120 (0.86)	1.54 (1.19, 1.99)	0.50 (0.29, 0.87)	<0.001
Farmer	277 (2.19)	3.99 (3.20, 4.97)	0.47 (0.30, 0.74)	<0.001
All type of paid job	81 (1.71)	3.10 (2.33, 4.14)	0.46 (0.28, 0.77)	<0.001
Unemployed	17 (1.61)	2.92 (1.74, 4.87)	0.66 (0.32, 1.33)	<0.001
Other	55 (16.72)	35 (25.39, 50.4)	1.25 (0.74, 2.11)	<0.001
Doing work related physical activity				<0.001
Never	400 (8.89)	1		
Sometimes	375 (2.28)	0.24 (0.21, 0.27)	0.59 (0.46, 0.77)	
Most of the time	275 (1.61)	0.17 (0.14, 0.19)	0.36 (0.27, 0.49)	
Food security				
Secure	427 (1.33)	1		
Mildly insecure	115 (1.58)	1.18 (0.96, 1.46)	1.18 (0.86, 1.62)	0.105
Moderately insecure	430 (2.26)	1.71 (1.49, 1.96)	1.49 (1.20, 1.86)	<0.01
Severely insecure	202 (3.52)	2.69 (2.28, 3.19)	2.11 (1.59, 2.80)	<0.01
Location of place				
High land	830 (1.84)	1		
Low land	396 (1.77)	0.96 (0.85, 1.08)	0.93 (0.75, 1.15)	0.520
Marital status				
Under age	79 (0.39)	1		
Married	460 (2.11)	5.45 (4.29, 6.93)	4.07 (0.67, 24.51)	<0.001
Single	312 (1.58)	4.07 (3.17, 5.21)	5.25 (0.87, 31.51)	<0.001
Divorced	143 (5.98)	16 (12.20, 21.3)	5.47 (0.90, 33.31)	<0.001
Widowed	205 (8.69)	23.9 (18.4, 31.2)	4.03 (0.66, 24.70)	<0.001
Separated	27 (2.74)	7 (4.58, 11.1)	7.52 (1.18, 47.84)	<0.001

married people were found with lesser odds of disability compared to their unmarried counterparts, single, divorced, or widowed [30]. Another study done in middle and low-income countries also showed that the prevalence was higher among divorced/separated/widowed adults than among the married/cohabiting respondents [2]. A disability doesn't affect only individual health but also brings family/social crisis in a marriage. A previous study indicated that parents with a child on the Autistic Spectrum got divorced [31].

This is one of the biggest studies investigating the burden of disability in northwest Ethiopia and is believed to fill the knowledge gap and contribute to policy determination, clinical practice, and decision-making in the country. However, it is not free from some limitations. For instance, the study did not show the severity as well as the definitive causes of disability due to the cross-sectional nature of the study. In addition, the self-reported nature of this study means that the problems can be under or over reported. Disability is an umbrella term and the problems associated with it were not studied in depth. For example, the magnitude of limitations in each and every activity of daily living was not assessed.

Conclusion

Even though the prevalence of disability in our finding is lower than the global statistics, the study reveals that there is a noticeable burden of disability at the Dabat HDSS site. Vision disability is the highest of all disabilities. Age, wealth status, food security status, marital, and occupational status were significantly associated with disability. Community education and creating a safe environment are key to prevent injuries which can result in disabilities. There is also a need to establish social protection strategies for the older, food in-secured, and poorest segments of the community. Furthermore, future researches need to cover a wider range and depth of disability to properly quantify disability and problems associated with it.

Abbreviations

ADL: Activities of daily livings; AOR: Adjusted odds ratio; HDSS: Health and demographic surveillance system; HFIAS: Household Food Insecurity Access Scale; HRS: Household Registration System; INDEPTH: International Network of Demographic Evaluation of Populations and Their Health; LFS AHM: Labour Force Survey ad hoc module; PCA: Principal Component Analysis; SADPD: Secretariat for the African decade of disabled person

Acknowledgements

Authors would like to thank the Dabat population and all respondents for their willingness to participate in the study. They are also grateful to the University of Gondar, Ethiopian Public Health Association/CDC for funding and material support. Finally, authors' appreciations go to Dabat HDSS site staffs for their unreserved contribution in data collection activities.

Authors' contribution

MBC*, SM, GA, YK, MY, KA, TA, MW, AG designed the study, developed the tool, coordinated the data collection activity. MB*, SM, GA, TA, AS, AT, ZG carried out the statistical analysis. EG participated in the design of the study, tool development, and drafting the manuscript. MB*, SM AT, GA drafted the manuscript. All authors read and approved the final manuscript.

Funding

This study was funded by Ethiopian Public Health Association/CDC and the University of Gondar. The views presented in the article are of the author and not necessarily express the views of the funding organization. The funders were not involved in the design of the study, data collection, analysis and interpretation.

Availability of data and materials

Data will be available upon request from the corresponding author.

Ethics approval and consent to participate

The study protocol was ethically approved by the Ethical Review Board (IRB) of the University of Gondar. Written informed consent was obtained from the head of the household. Moreover, the confidentiality of information was guaranteed by using code numbers rather than personal identifiers and by keeping the data locked.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Received: 1 November 2016 Accepted: 15 September 2017
Published online: 02 October 2017

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